1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{4}, \frac{7}{4}, \text{ and } \frac{1}{5}$$

A. $a \in [71, 88], b \in [-99, -95], c \in [-89, -81],$ and $d \in [-25, -15]$

B. $a \in [71, 88], b \in [-222, -215], c \in [143, 147],$ and $d \in [-25, -15]$

C. $a \in [71, 88], b \in [-99, -95], c \in [-89, -81],$ and $d \in [16, 31]$

D. $a \in [71, 88], b \in [57, 67], c \in [-121, -119],$ and $d \in [16, 31]$

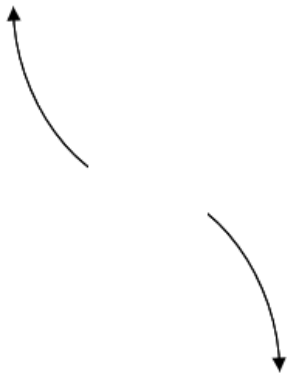
E. $a \in [71, 88], b \in [94, 102], c \in [-89, -81],$ and $d \in [-25, -15]$

---

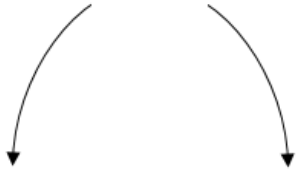
2. Describe the end behavior of the polynomial below.

$$f(x) = 7(x-7)^4(x+7)^7(x-3)^2(x+3)^2$$

A.

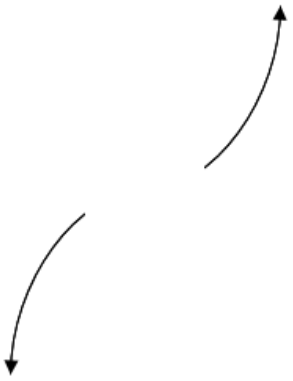


B.



C.

D.



E. None of the above.

---

3. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 - 4i \text{ and } -4$$

A. $b \in [3, 20], c \in [-0.68, 1.9],$ and $d \in [-168, -161]$

B. $b \in [-1, 4], c \in [5.04, 8.21],$ and $d \in [16, 23]$

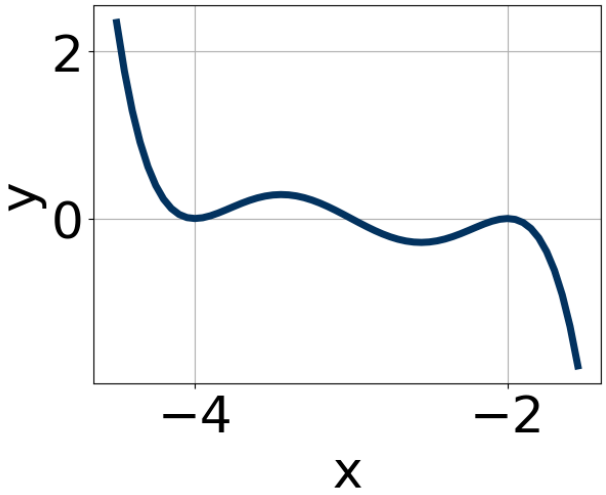
C. $b \in [-6, -4], c \in [-0.68, 1.9],$ and $d \in [164, 166]$

D. $b \in [-1, 4], c \in [-1.45, 0.42],$ and $d \in [-20, -17]$

E. None of the above.

---

4. Which of the following equations *could* be of the graph presented below?



A. $-13(x+2)^{10}(x+4)^{7}(x+3)^{6}$

B. $18(x+2)^{10}(x+4)^{6}(x+3)^{10}$

C. $16(x+2)^{4}(x+4)^{4}(x+3)^{5}$

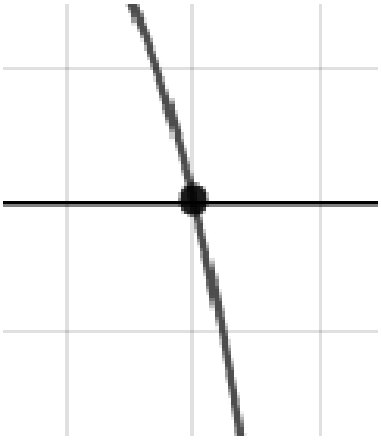
D. $-6(x+2)^{10}(x+4)^{6}(x+3)^{5}$

E. $-15(x+2)^{6}(x+4)^{7}(x+3)^{11}$

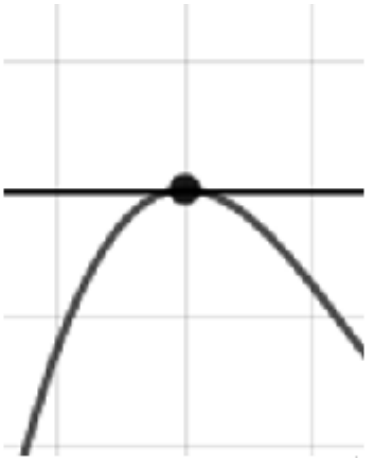
---

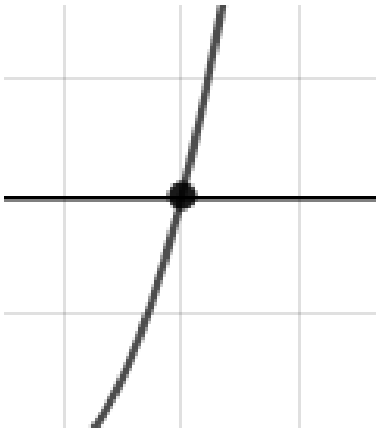
5. Describe the zero behavior of the zero $x = -8$ of the polynomial below.

$$f(x) = 6(x+7)^3(x-7)^2(x-8)^5(x+8)^4$$

A. 

C. 

B. 

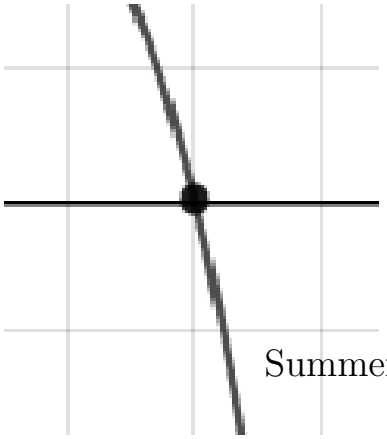
D. 

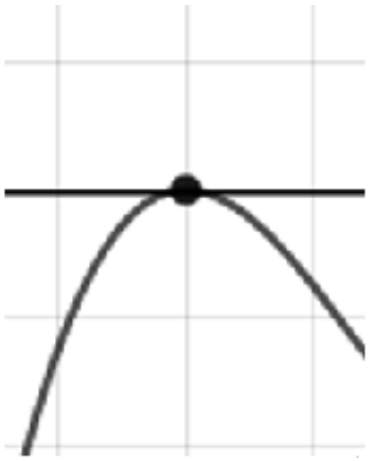
E. None of the above.

---

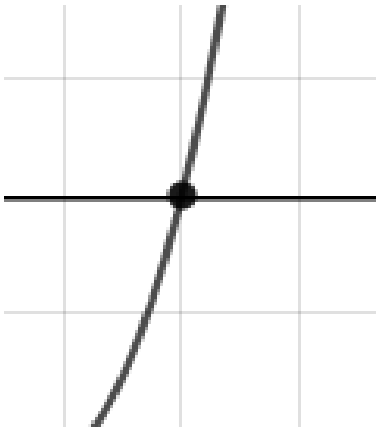
6. Describe the zero behavior of the zero $x = -9$ of the polynomial below.

$$f(x) = -2(x+9)^6(x-9)^9(x-8)^2(x+8)^5$$

A. 

B. 

C. 

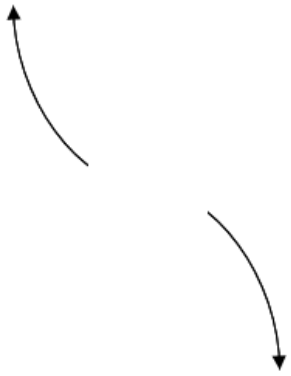
D. 

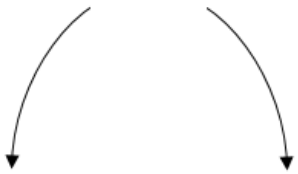
E. None of the above.

---

7. Describe the end behavior of the polynomial below.

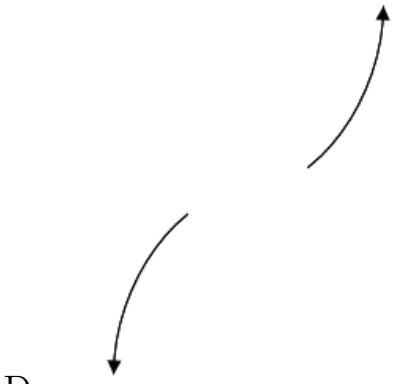
$$f(x) = -4(x-2)^3(x+2)^4(x-9)^5(x+9)^5$$

A. 

B. 

C.

D.



E. None of the above.

---

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 + 2i \text{ and } 1$$

A. $b \in [-6.2, -2.7], c \in [7, 14],$ and $d \in [10, 14]$

B. $b \in [1.3, 5.6], c \in [7, 14],$ and $d \in [-16, -7]$

C. $b \in [-0.3, 3.3], c \in [-2, 3],$ and $d \in [-5, 0]$

D. $b \in [-0.3, 3.3], c \in [-6, -1],$ and $d \in [0, 3]$

E. None of the above.

---

9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-5}{4}, \frac{-3}{4}, \text{ and } 5$$

A. $a \in [15, 19], b \in [42, 52], c \in [-151, -140],$ and $d \in [68, 80]$

B. $a \in [15, 19], b \in [-48, -41], c \in [-151, -140],$ and $d \in [68, 80]$

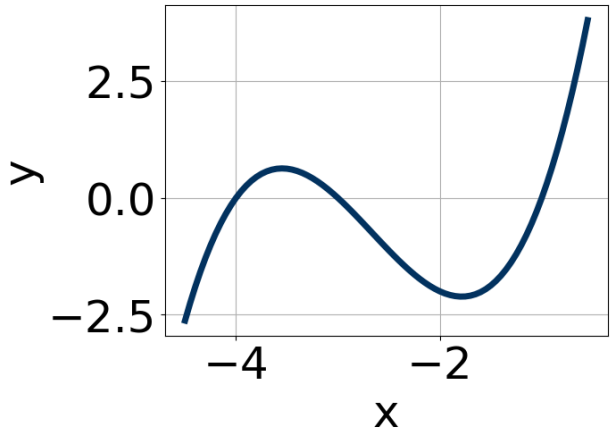
C. $a \in [15, 19], b \in [-48, -41], c \in [-151, -140],$ and $d \in [-76, -69]$

D. $a \in [15, 19], b \in [-94, -79], c \in [23, 34],$ and $d \in [68, 80]$

E. $a \in [15, 19], b \in [-119, -111], c \in [173, 179],$ and $d \in [-76, -69]$

---

10. Which of the following equations *could* be of the graph presented below?



A. $5(x+1)^8(x+3)^4(x+4)^5$

B. $-17(x+1)^4(x+3)^5(x+4)^5$

C. $10(x+1)^{11}(x+3)^7(x+4)^{11}$

D. $5(x+1)^4(x+3)^{11}(x+4)^{11}$

E. $-9(x+1)^7(x+3)^{11}(x+4)^9$

---

11. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{5}{2}, \frac{-1}{2}, \text{ and } -7$$

A. $a \in [2, 10], b \in [36.1, 42.5], c \in [86, 95],$ and $d \in [30, 40]$

B. $a \in [2, 10], b \in [18.8, 21.8], c \in [-65, -58],$ and $d \in [-35, -32]$

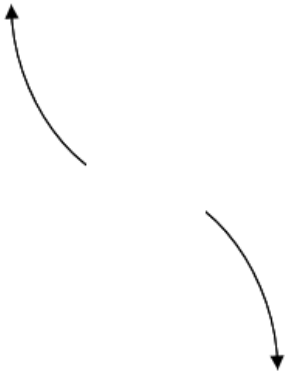
C. $a \in [2, 10], b \in [35.9, 37.2], c \in [42, 60],$ and $d \in [-35, -32]$

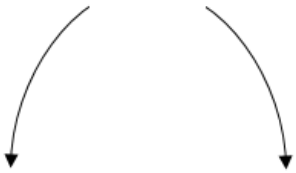
D. $a \in [2, 10], b \in [-22.7, -19.9], c \in [-65, -58],$ and $d \in [30, 40]$

E. $a \in [2, 10], b \in [18.8, 21.8], c \in [-65, -58],$ and $d \in [30, 40]$

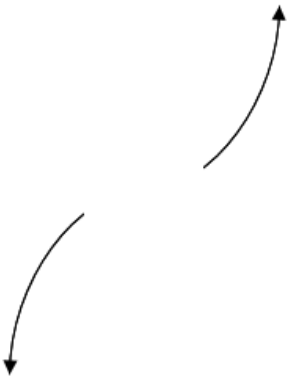
12. Describe the end behavior of the polynomial below.

$$f(x) = -6(x-6)^3(x+6)^6(x+2)^3(x-2)^3$$

A.


B.


C.


D.


E. None of the above.

13. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$4 - 3i \text{ and } 2$$

A. $b \in [-15, -8], c \in [35, 44],$ and $d \in [-50, -44]$

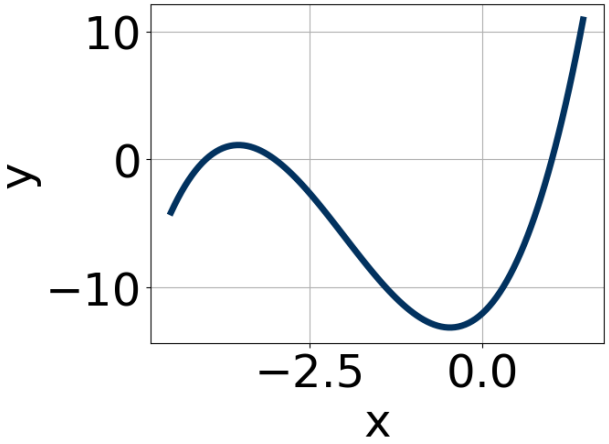
B. $b \in [-5, 4], c \in [1, 7],$ and $d \in [-8, 2]$

C. $b \in [10, 15], c \in [35, 44],$ and $d \in [50, 56]$

D. $b \in [-5, 4], c \in [-9, 0],$ and $d \in [6, 11]$

E. None of the above.

14. Which of the following equations *could* be of the graph presented below?



A. $15(x-1)^4(x+3)^4(x+4)^9$

B. $-12(x-1)^{10}(x+3)^{11}(x+4)^{11}$

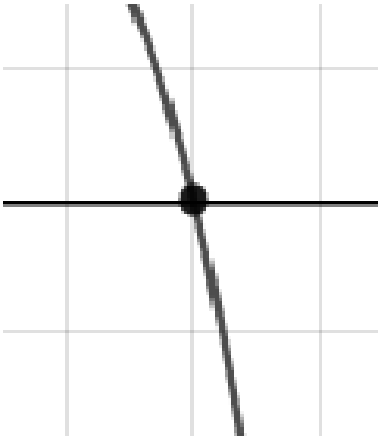
C. $-11(x-1)^{11}(x+3)^7(x+4)^7$

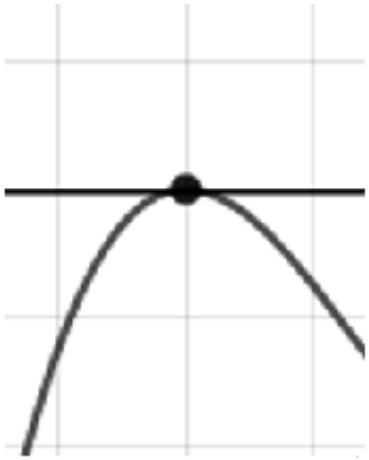
D. $3(x-1)^7(x+3)^9(x+4)^9$

E. $20(x-1)^8(x+3)^5(x+4)^9$

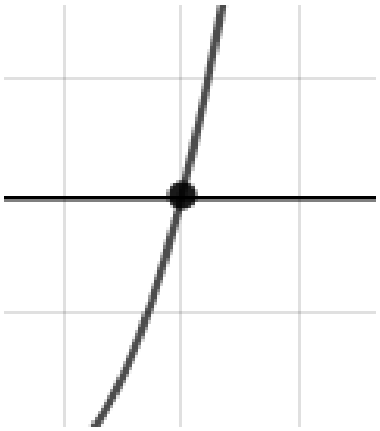
15. Describe the zero behavior of the zero $x = 4$ of the polynomial below.

$$f(x) = -6(x-4)^2(x+4)^3(x-8)^2(x+8)^5$$

A. 

B. 

C. 

D. 

E. None of the above.

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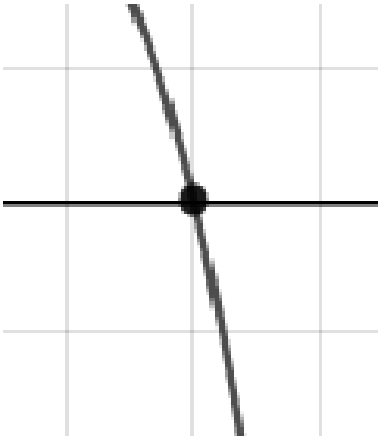
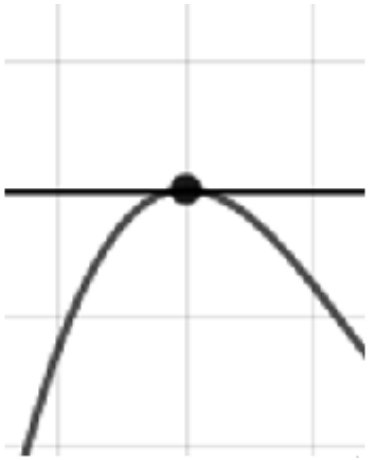
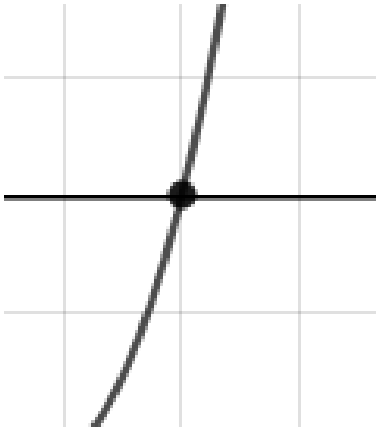
16. Describe the zero behavior of the zero $x = 5$ of the polynomial below.

$$f(x) = -5(x+5)^3(x-5)^4(x+7)^2(x-7)^4$$

A. 

C. 

B. 

D. 

E. None of the above.

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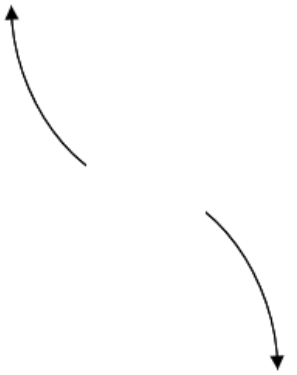
17. Describe the end behavior of the polynomial below.

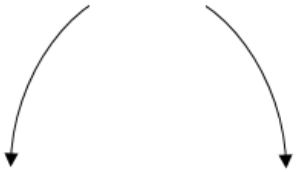
$$f(x) = 6(x-6)^4(x+6)^7(x-5)^3(x+5)^4$$

A.

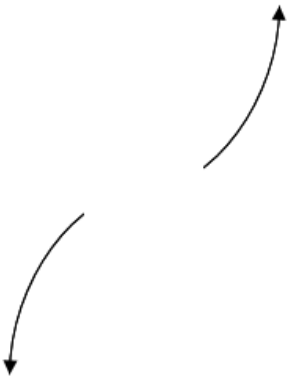


C.

B.



D.



E. None of the above.

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18. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 - 4i \text{ and } 1$$

A. $b \in [-2.7, 4.7], c \in [0.81, 2.83],$ and $d \in [-3.5, -2.56]$

B. $b \in [-7.9, -3.5], c \in [17.28, 19.46],$ and $d \in [24.68, 25.62]$

C. $b \in [-2.7, 4.7], c \in [2.24, 5.06],$ and $d \in [-4.56, -3.05]$

D. $b \in [3.6, 7.4], c \in [17.28, 19.46],$ and $d \in [-25.02, -24.7]$

E. None of the above.

---

19. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-2}{3}, \frac{1}{3}, \text{ and } \frac{5}{4}$$

A. $a \in [35, 37], b \in [-38, -31], c \in [-31, -22], \text{ and } d \in [-13, -7]$

B. $a \in [35, 37], b \in [-38, -31], c \in [-31, -22], \text{ and } d \in [8, 17]$

C. $a \in [35, 37], b \in [-60, -55], c \in [4, 16], \text{ and } d \in [8, 17]$

D. $a \in [35, 37], b \in [-86, -76], c \in [53, 57], \text{ and } d \in [-13, -7]$

E. $a \in [35, 37], b \in [32, 39], c \in [-31, -22], \text{ and } d \in [-13, -7]$

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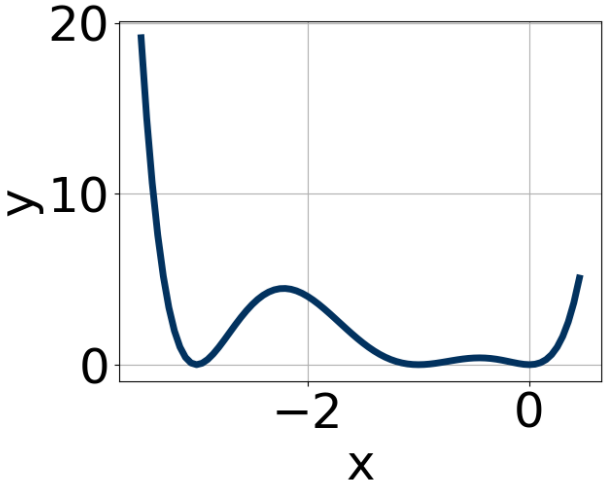
20. Which of the following equations *could* be of the graph presented below?



A. $4x^{10}(x+3)^{10}(x+1)^6$

B. $10x^8(x+3)^8(x+1)^{11}$

C. $6x^5(x+3)^4(x+1)^9$

D. $-15x^{10}(x+3)^4(x+1)^{10}$

E. $-6x^6(x+3)^8(x+1)^5$

21. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{4}{3}, \frac{2}{3}, \text{ and } \frac{3}{5}$$

A. $a \in [43, 49], b \in [-121, -109], c \in [94, 102],$ and $d \in [-30, -23]$

B. $a \in [43, 49], b \in [115, 126], c \in [94, 102],$ and $d \in [24, 25]$

C. $a \in [43, 49], b \in [2, 5], c \in [-61, -52],$ and $d \in [24, 25]$

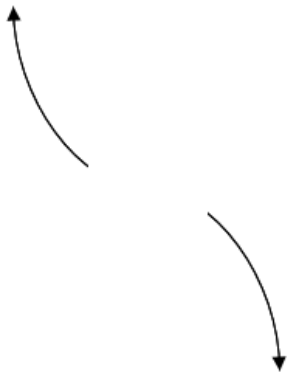
D. $a \in [43, 49], b \in [63, 65], c \in [-21, -6],$ and $d \in [-30, -23]$

E. $a \in [43, 49], b \in [-121, -109], c \in [94, 102],$ and $d \in [24, 25]$

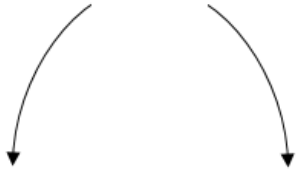
22. Describe the end behavior of the polynomial below.

$$f(x) = 8(x-9)^5(x+9)^{10}(x-3)^3(x+3)^5$$

A.

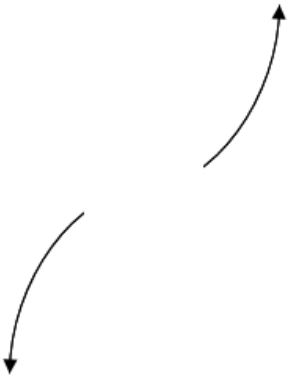


B.



C.

D.



E. None of the above.

23. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$2 + 4i \text{ and } 1$$

A. $b \in [4.8, 7.3], c \in [22.72, 24.73]$, and $d \in [18.8, 23.2]$

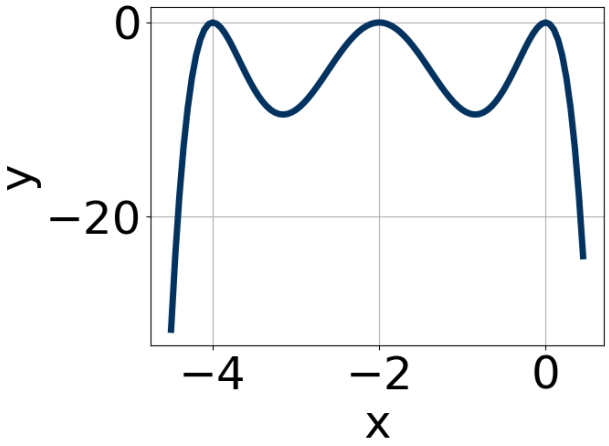
B. $b \in [-0.5, 1.6], c \in [-4.03, -2.68]$, and $d \in [0.5, 2.3]$

C. $b \in [-8.6, -2.1], c \in [22.72, 24.73]$, and $d \in [-21.3, -19.8]$

D. $b \in [-0.5, 1.6], c \in [-5.22, -3.99]$, and $d \in [2.7, 7]$

E. None of the above.

24. Which of the following equations *could* be of the graph presented below?



A. $18x^5(x+2)^8(x+4)^4$

B. $9x^{10}(x+2)^8(x+4)^6$

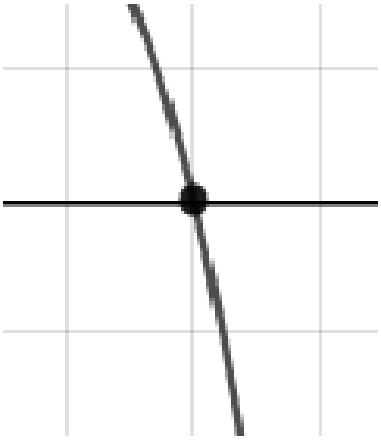
C. $-6x^5(x+2)^8(x+4)^6$

D. $-3x^4(x+2)^8(x+4)^8$

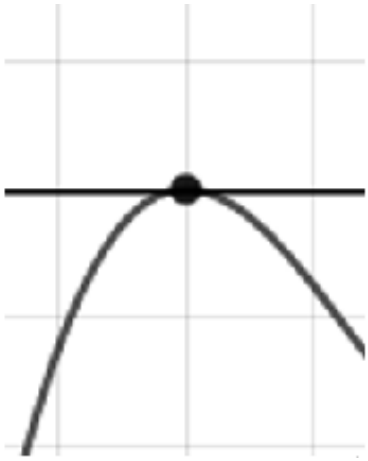
E. $-14x^5(x+2)^6(x+4)^5$

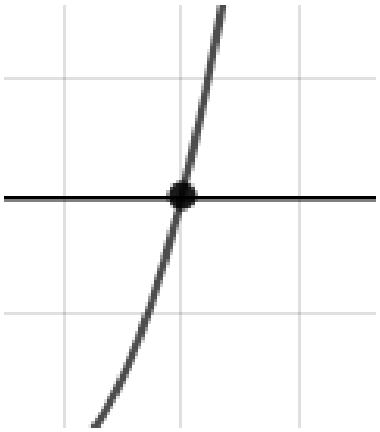
25. Describe the zero behavior of the zero $x = 9$ of the polynomial below.

$$f(x) = 9(x-3)^{11}(x+3)^{8}(x-9)^{10}(x+9)^{9}$$

A. 

C. 

B. 

D. 

E. None of the above.

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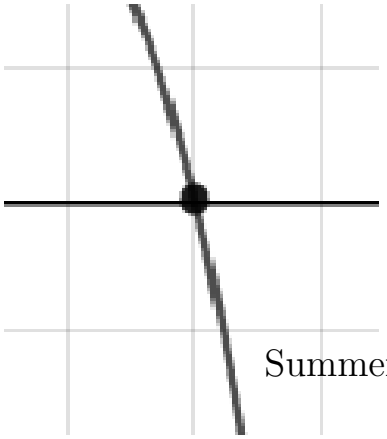
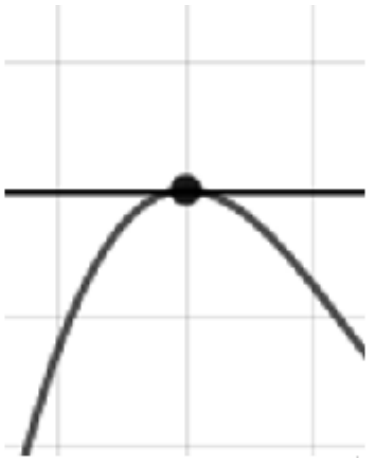
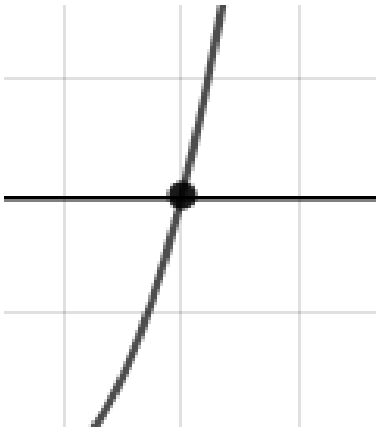
26. Describe the zero behavior of the zero $x = 4$ of the polynomial below.

$$f(x) = 5(x+6)^{5}(x-6)^{4}(x+4)^{9}(x-4)^{6}$$

A. 

B. 

C. 

D. 

E. None of the above.

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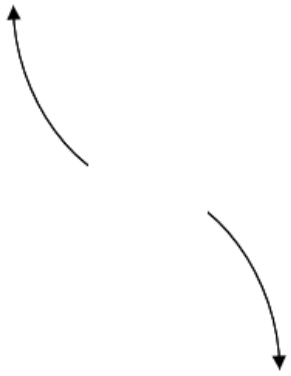
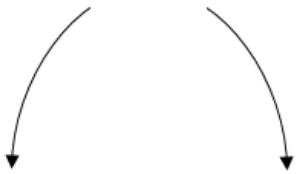
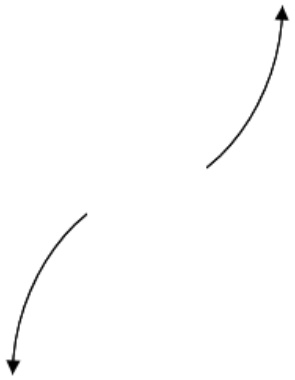
27. Describe the end behavior of the polynomial below.

$$f(x) = 2(x+4)^3(x-4)^8(x-5)^5(x+5)^6$$

A. 

B. 

C. 

D. 

E. None of the above.

---

28. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-4 - 3i \text{ and } 1$$

A. $b \in [-2.3, 1.9], c \in [1.81, 2.56],$ and $d \in [-3.42, -2.96]$

B. $b \in [-8.3, -5.2], c \in [15.94, 17.54],$ and $d \in [24.44, 26.01]$

C. $b \in [4.9, 8.8], c \in [15.94, 17.54],$ and $d \in [-26.86, -23.36]$

D. $b \in [-2.3, 1.9], c \in [2.49, 3.29],$ and $d \in [-4.03, -3.82]$

E. None of the above.

---

29. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-7}{4}, \frac{7}{2}, \text{ and } \frac{-3}{5}$$

A. $a \in [33, 45], b \in [-46, -44], c \in [-295, -277],$ and $d \in [-147, -143]$

B. $a \in [33, 45], b \in [90, 98], c \in [-205, -195],$ and $d \in [-147, -143]$

C. $a \in [33, 45], b \in [35, 50], c \in [-295, -277],$ and $d \in [146, 151]$

D. $a \in [33, 45], b \in [-186, -184], c \in [111, 127],$ and $d \in [146, 151]$

E. $a \in [33, 45], b \in [-46, -44], c \in [-295, -277],$ and $d \in [146, 151]$

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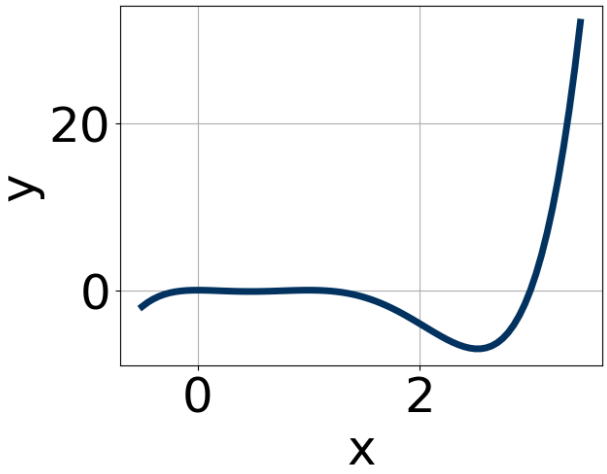
30. Which of the following equations *could* be of the graph presented below?



A. $6x^9(x-1)^4(x-3)^5$

B. $19x^{11}(x-1)^8(x-3)^6$

C. $9x^4(x-1)^{10}(x-3)^9$

D. $-8x^{10}(x-1)^8(x-3)^7$

E. $-11x^4(x-1)^8(x-3)^8$
